

IFW

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Thomas FEHN, et al.  
Serial No. : 10/524,512  
Filed : May 17, 2005  
For : FARADAY ROTATOR

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C. Bruce Hamburg  
(Name)

  
(Signature)

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450


SUBMISSION OF ENGLISH TRANSLATION OF WRITTEN  
OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

Sir:

Submitted herewith is an English translation of the "Written Opinion of the International Searching Authority".

Respectfully submitted,

Jordan and Hamburg LLP

By   
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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference S 22. 726 O-OP	FOR FURTHER ACTION		See item 4 below
International application No. PCT/EP2004/004232	International filing date ( <i>day/month/year</i> ) 21 April 2004 (21.04.2004)	Priority date ( <i>day/month/year</i> ) 23 July 2003 (23.07.2003)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant LINOS PHOTONICS GMBH & CO. KG			

<p>1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p>In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.</p>																	
<p>3. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/> Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input checked="" type="checkbox"/> Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/> Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/> Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/> Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/> Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/> Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/> Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>		<input checked="" type="checkbox"/> Box No. I	Basis of the report	<input checked="" type="checkbox"/> Box No. II	Priority	<input type="checkbox"/> Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/> Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/> Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/> Box No. VI	Certain documents cited	<input type="checkbox"/> Box No. VII	Certain defects in the international application	<input type="checkbox"/> Box No. VIII	Certain observations on the international application
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<input type="checkbox"/> Box No. VIII	Certain observations on the international application																
<p>4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).</p>																	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland  Facsimile No. +41 22 740 14 35	Date of issuance of this report 29 May 2006 (29.05.2006)
	Authorized officer  Ellen Moyse  Telephone No. +41 22 338 89 75

# PATENT COOPERATION TREATY

Translation

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing  
(day/month/year)

Applicant's or agent's file reference

**S 22. 726 0-OP**

**FOR FURTHER ACTION**

See paragraph 2 below

International application No.

**PCT/EP2004/004232**

International filing date (day/month/year)

**21.04.2004**

Priority date (day/month/year)

**23.07.2003**

International Patent Classification (IPC) or both national classification and IPC

Applicant

**LINOS PHOTONICS GMBH & CO. KG**

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2004/004232

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐

This opinion has been established on the basis of a translation from the original language into the following language

\_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐

a sequence listing

☐

table(s) related to the sequence listing

b. format of material

☐

in written format

☐

in computer readable form

c. time of filing/furnishing

☐

contained in the international application as filed.

☐

filed together with the international application in computer readable form.

☐

furnished subsequently to this Authority for the purposes of search.

3. ☐

In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2004/004232

Box No. II      Priority

1. ☒ The following document has not yet been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date in the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/EP2004/004232

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims \_\_\_\_\_ YES  
Claims 1, 5 \_\_\_\_\_ NO

Inventive step (IS)

Claims \_\_\_\_\_ YES  
Claims 2-4 \_\_\_\_\_ NO

Industrial applicability (IA)

Claims 1-5 \_\_\_\_\_ YES  
Claims \_\_\_\_\_ NO

2. Citations and explanations:

1. The present opinion makes reference to the following documents:

D1: US 5 115 340 A (TIDWELL STEVE C) 19 May 1992  
(1992-05-19)

D2: US 3 781 592 A (HARROLD W) 25 December 1973  
(1973-12-25)

2. INDEPENDENT CLAIM 1

Document D1 is regarded as the closest prior art. It discloses (the references between parentheses relate to said document):

a Faraday rotator for a Faraday isolator (for example figures 3, 4, 6, 8 and column 3, lines 29 - 55; column 5, lines 31 - 58), having an inlet polarizer and an outlet polarizer (only illustrated in figure 6 (128)), having an interposed, cylindrical optical crystal (figure 3 (52), figure 4 (72), figure 8 (182)), which is arranged symmetrically with respect to its axis of symmetry, having a perpendicular cylinder which surrounds said optical crystal and has a hollow space made from a permanently magnetic material, which is axially

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

magnetized and whose magnetic field extends in the hollow space approximately parallel to the axis of symmetry which runs in only one direction from the north pole to the south pole (*for example figure 8 (184)*), having in each case one pole piece which adjoins the two end faces in the plane enclosed by the y direction and the z direction which are perpendicular to the axis of symmetry, each of said pole pieces being in the form of a hollow perpendicular cylinder and having a through-opening as an extension of the axis of symmetry (*for example figure 8 (186, 188)*), each pole piece being radially magnetized, at least in regions, essentially with respect to the axis of symmetry (*see arrows in figures 3, 4*), one of the two pole pieces being magnetized in the radial direction from the inside to the outside, and the other pole piece being magnetized in the radial direction from the outside to the inside (*see arrows in figures 3, 4*), and the north pole of the hollow cylinder adjoining the pole piece which is magnetized in the direction from the inside to the outside, and the south pole of the hollow cylinder adjoining the pole piece which is magnetized in the direction from the outside to the inside (*see arrows in figures 3, 4*).

The subject matter of claim 1 is therefore not novel (PCT Article 33(2)).

Reference is made to the fact that the technical feature *terminal magnet* of the current claim 1 can be treated as being equivalent to the technical

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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

feature pole piece of the Faraday rotator described in document D1. A pole piece is, by definition, manufactured from a material having a high degree of permeability and represents a permanent magnet if it has once been subjected or is being subjected to a magnetic field. In the Faraday rotator described in document D1, the pole pieces are subjected to the axially symmetrical magnetic field of the cylindrical permanent magnet (see, for example, figure 8); the pole pieces are therefore themselves magnetized or permanently magnetic. Their magnetic field is superimposed on the magnetic field of the cylindrical permanent magnet, as a result of which the total magnetic field is concentrated at the point of the magneto-optical crystal in the interior of the cylindrical permanent magnet (see figure 8). The pole pieces in the component from document D1 and the terminal magnets in the present application therefore solve the same technical problem, namely that of concentrating the axially symmetrical magnetic field of a cylindrical permanent magnet.

3. DEPENDENT CLAIMS 2-5

Claims 2-5 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for novelty and inventive step.

3.1. The additional features of dependent claims 2-4 are known, for example, from document D2, which describes a radially magnetized permanent magnet



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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

(see figure 2, abstract and column 6, lines 4-36). A combination of documents D1 and D2 is obvious since explicit reference is made in document D2 to the use of permanent magnets described therein in Faraday rotators and isolators (column 2, lines 2-5). The subject matter of claims 2-4 is therefore not inventive (PCT Article 33(3)).

3.2. The additional features of dependent claim 5 are already known from document D1 (see figure 4). The subject matter of claim 5 is therefore not novel (PCT Article 33(2)).